THE UNIVERSAL LAW OF DIMINISHING RETURNS. ANOTHER COMMENT.

Since Professor Bullock* has not claimed that his classification is complete, the following suggestions cannot be regarded as, in any sense, a criticism. They are intended rather as an extension of his classification. He has, in accordance with the original meaning of the law of diminishing returns, restricted its application to the amount which can be produced by varying amounts of labor and capital applied to the cultivation of a given piece of land of fixed area. It may be compactly expressed as follows: —

Acres of land.		Units of labor.		Units of capital.		Units of product.
If X	with	Y	with	Z	will produce	P,
then X	with	aY	with	aZ	will produce more than P, but less than aP.	

(It being assumed that a is a positive quantity greater than 1.)

But if, instead of assuming a fixed quantity of land, we consider the broader question of the joint productivity of the three factors,— land, labor, and capital,— when combined in varying proportions, this formula can be considerably extended: —

Acres of land.		Units of labor.		Units of capital.		Units of product.
For aX	with	aY	with	Z	will produce more than P, but less than aP,	
and aX	with	Y	with	aZ	will produce more than P, but less than aP.	

Each of these formulæ expresses a law of diminishing returns identical with the law of diminishing returns from land, except that, in one case, labor, and, in the other, capital, is regarded as the fixed factor instead of land.

But, if we conceive of a fourth factor,— namely, " management,"— and assign to it a quantitative expression, we can still further extend the formula: —

* Cf. *The Variation of Productive Forces*, by Charles J. Bullock, in this *Journal* for August, 1902.

Land.	Labor.	Capital.	Management.		Product.

If   X   with   Y   with   Z   with   M   will produce   P,
then aX   with aY   with aZ   with   M   will produce more than P, but less than aP.

Provided the limit has been reached beyond which large-scale production is less productive than small-scale production. If that limit has not been reached in the establishment in question, the formula would be : —

> aX with aY with aZ with M will produce more than aP.

This would be a case of increasing returns with the factor called "management," instead of land, as the fixed factor. It would also be a case of what Professor Bullock calls the "Law of Economy of Organization." Viewed from this standpoint, the two supposed laws are one and the same.

But each of the factors named is capable of being subdivided into a large number of non-competing, co-operating groups; and the formula ought, in strictness, to be so extended as to assign a separate quantity to each such group. A given laborer, for example, only competes, in the strictest sense, with those other laborers who are doing, or are willing to do, the same kind of work that he is doing. All beside these 'are co-ordinating their efforts with his, and increasing the effective demand for his labor. Other things equal, the more there are to do his kind of work, the less value he can produce, and the worse it is for him; but the more there are to do other kinds of work, the more value he can produce, and the better it is for him. It is quite as much to his advantage that there should be an increase in the supply of other kinds of labor as that there should be an increase of land or capital, provided this increase in other kinds of labor does not cause such a shifting about of laborers as to increase the number in his particular group. The same rule will apply to different forms of capital or different kinds of land. This is the identical law which has long been called the law of diminishing returns from land, except that, in this case, any particular form of labor, land, or capital, is regarded as the fixed factor, all other factors being regarded as variable. This extension of the law of diminishing returns is essential to any complete theory of distribution.   T. N. CARVER.